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Research, Development, and Acquisition

GUIDANCE FOR INTEGRATED PRODUCT AND PROCESS MANAGEMENT

VOLUME 2

APPLICATIONS

PREPARED
BY
U.S. ARMY MATERIEL COMMAND

PREFACE

This Guidebook is a three volume set prepared by the U.S. Army Materiel Command to provide internal Army guidance for the implementation of Integrated Product and Process Management (IPPM).

This volume covers guidance on the operational application of Integrated Product and Process Management (IPPM) and on best value contracting. The primary user is the Integrated Product Team (IPT). Other users are those concerned with the management of the process and/or the qualification training of people for the IPT.

Volume 3 describes IPPM as it relates to Integrated Product and Process Development (IPPD) and offers tools and practices to aid in implementation. We have organized Volume 3 into three sections; Section I - Introduction, Section II - IPPD Tools and Technologies, and Section III - IPPD Assessment Criteria.

Volume 1 covers the concept and implementation of IPPM. It is managerial guidance and should be of primary interest to Army program/project/product managers, matrix support managers and managers of weapon system development. The secondary use is for leadership of the Army Integrated Product Team (IPT), as well as one of the tools for qualification training of people for the IPT. We have organized Volume 1 into five sections; Section I - Introduction, Section II - Organization and Resources, Section III - Acquisition Management, Section IV - Design Process, and Section V - Tailoring to Acquisition Strategies.

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GUIDANCE FOR INTEGRATED PRODUCT AND PROCESS MANAGEMENT APPLICATIONS

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I. PURPOSE

This volume is devoted to the integrated product team (IPT) leader and members who need "How-To" knowledge in establishing and maintaining their integrated product team. The IPPM concept envisions the formation of IPTs early in the life cycle. These teams would remain active throughout the life cycle. It may be necessary to transition from one team to another. When such transitions occur, the integrated design approach transitions as well. Separate functional reviews may be used as input to the IPT.

Included in appendix A for developmental procurement are information on the following:

- Sample wording and topics for Executive Summary.
- Sample Statement of Work language for Integrated Master Plan (IMP) and Integrated Master Schedule (IMS).
- Sample language for Section L.
- Sample language for Section M.
- Sample language for Standards portion of the Source Selection Plan.

Tailoring of the above information for each procurement is necessary.

This IPT guidance is broken down by phases for ease of reading. However, the team should consider the entire life cycle of the program and not be limited to the life cycle phase they are in.

Worksheets have been designed for an IPT to address the IPPM concept and to assure a streamlined best value approach to Army acquisitions. However, these worksheets do not address the entire spectrum of support required by a program during different stages of the life cycle. They do foster a greater sensitivity to the IPPM concept, for avoidance of non-value-added requirements, and to help with program tailoring.

II. TEAM COMPOSITION

The team should include representatives from all of the elements that are responsible for the various functions that influence the design. Development of the team’s charter should be the first function performed (see for example the AMC IPPM charter, appendix B). It is important to establish upfront the authority and responsibilities of the team(s).

Simply assigning people to serve on these teams does not assure effective IPT functioning. Team members should be qualified in advance for the IPT through training and experience. Teams usually go through several phases as they proceed from a collection of individuals to a cohesive unit. Both team continuity and training should be required.

Integrating the processes described above into the Army organizations will be a significant challenge. This section identifies the phased composition of the IPT, the tasks the IPT should perform, and provides phased worksheets to help the IPT in achieving best value acquisition.

A free flow of ideas and information between the IPT and industry experts should be encouraged. This operational guidance may be tailored to match the specific needs of the project.

III. INTEGRATED PRODUCT TEAM LIFE CYCLE RESPONSIBILITY

A. PRECONCEPT, PREMILESTONE 0

1. Preconcept Team Composition. Independent of the life cycle phases, the science and technology base is investigating technologies that could lead to more effective systems. At the same time, U.S. Army Training and Doctrine Command (TRADOC) is developing warfighting concepts focused on the future that will become the Army's "Blueprint" for determining Doctrine, Training, Leader Development, Organization and Materiel in Support of Soldiers (DTLOMS) requirements. This approach documents Army goals for the science and technology community. This is accomplished under a TRADOC-led Integrated Concept Team (ICT) with support from the appropriate technology (propulsion, survivability, sensor, etc.) focused IPT. Formation of the ICT in early concept development enables the team to transition to a product focused IPT when the materiel requirement is approved.

A standing IPT should be formed for each technology area. The technology focused IPT compares and analyzes the future operational capabilities. Also, the IPT considers life cycle issues for the technologies being evaluated. Close coordination takes place between the ICT and technology focused IPT through shared membership. The ICT membership typically includes representatives from TRADOC (Battle LABS/schools), academia, industry, and appropriate Major Army Commands (MACOM).

During this phase, the composition of the technology focused IPT, generally should be from the organizational elements responsible for--

- Technology (Army Research Laboratories)(lead).
- Advanced Systems, Concepts and Planning.
- Design and Manufacturing Technology.
- Product Assurance.
- Logistics Support Analysis (LSA).

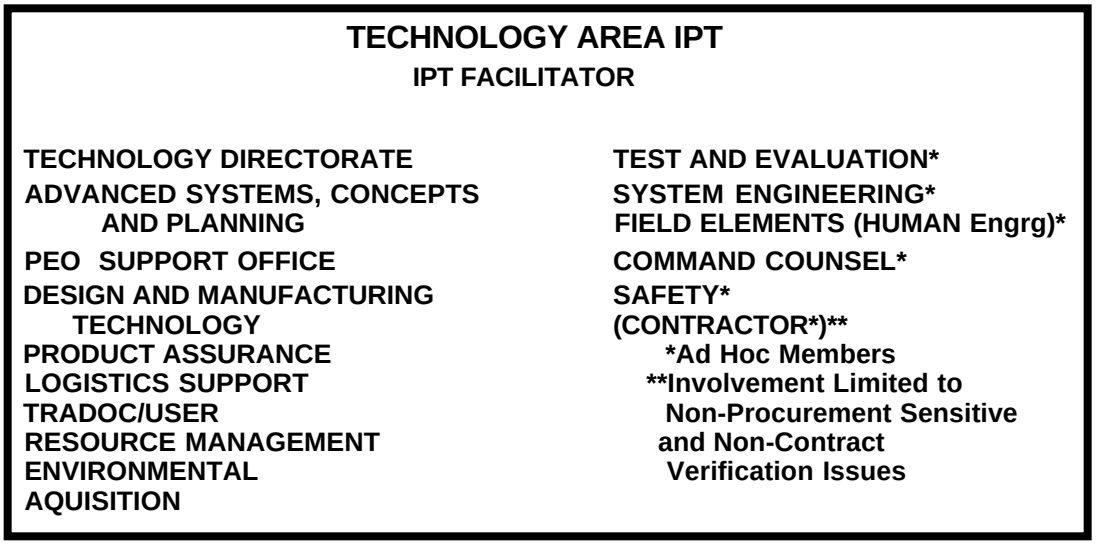

Figure 1. Technology Area IPT, Premilestone 0.

- Representatives from the Program Executive Officer (PEO) support office, Combat Developer (CD), Resource Management, Acquisition, and Integrated Materiel Management.

- Additional members from the Safety Office, Human Engineering, Test and Evaluation Community, Command Counsel, Environmental, Contractor and Systems Engineering would serve on an ad hoc basis, when needed.

This broad representation, as shown in figure 1, would assure concurrent consideration of the life cycle issues and would establish a sound basis for later phases.

2. Team Member Functions. The user community will formulate an appropriate Mission Needs Statement (MNS). The application of IPPM to this phase will enhance the tie between the technology base and the MNS being developed.

This phase either starts with a technology push based upon advances in new technologies or a technology pull based upon future threat assessments. These efforts usually result in the identification of potential science and technology project(s) to satisfy the technology need. Once technology has been developed to meet this need, design considerations should be determined. These design considerations are then used to establish realistic performance goals and tradeoff criteria. Next, measurable design parameters are established and resource requirements identified. Finally, the adequacy and availability of funding to pursue a design solution must be determined.

If more than one science and technology projects have a potential to satisfy the technology need, a decision should be made to determine which project or projects are to be pursued. Then, resources should be reallocated to reflect this determination. Next, whether the technology is to be developed using in-house resources or contracted out should be decided.

If the decision is to contract out the technology development, then contract requirements, source selection criteria and Request for Proposal (RFP) must be developed. Then best value analysis should be used to evaluate proposals.

Finally, the IPT should recommend a winner and assist in contract award.

If the decision is to develop the technology in-house, then resources should be allocated and technology development begun.

Through modeling and simulation, the finalized design concept may be determined. Next, the IPT evaluates the science and technology project(s) to verify applicability to original technology need. Finally, the technology-focused IPT assists the capability-focused ICT in the development of the MNS and prepares the Milestone 0 Decision Package.

3. WORKSHEET I, Premilestone 0. The following WORKSHEET is provided to help in the identification of technology area IPT functions for premilestone 0.

WORKSHEET I - Premilestone 0

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION:
• Identify potential Science and Technology projects.		
• Identify Design Considerations.		
• Establish performance goals.		
• Complete design concept.		
• Finalize team evaluation.		
• Draft Integrated Logistics Support Plan.		
• Recommend allocation of resources among competing projects. •• Assess producibility process, environmental, disposal, and impact of various potential science and technology areas. •• Establish tradeoff criteria between competing projects.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
•• Where technology does not exist, determine whether Army laboratories or industry should develop the technology. ••• If work is to be done under contract, develop RFP and assess industry recommended improvements. ••• Participate in a source selection evaluation board (SSEB) to advise the lead investigator and the contracting officer about which proposal best meets the overall objectives. ••• Investigate progress of the contractor.		
• Recommend how the technology should be transitioned into future programs.		
• Consider a partnering relationship with contractor(s).		
• Analyze the contractor's process for identifying, and selecting from among alternate solutions.		
• Identify a risk management program.		
• Identify the characteristics that are critical to the verification of people, product, and process solutions. The associated risks are included in risk management efforts.		
• Technical reviews are structured as a demonstration of the contractor's achievement of required accomplish- ments measured by appropriate		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
technical performance measurements and exit criteria. The contractor's demonstrations shall: •• Confirm the effect of risk education measures and assumptions used to quantify risks. •• Address relationships, interactions, interdependencies, and interfaces of systems and system elements. •• Confirm requirements and objectives, technical performance measurements, and technical plans are being tracked, on schedule, and are achievable. •• Confirm that continued development is warranted.		

B. CONCEPT EXPLORATION, MILESTONE 0

Phase 0 typically consists of competitive, parallel short-term concept studies. The focus of these efforts is to define and evaluate the feasibility of alternative concepts and to provide a basis for assessing the relative merits (i.e., advantages and disadvantages, degree of risk) of these concepts at the next milestone decision point. Analysis of alternatives shall be used as appropriate to facilitate comparisons of alternative concepts. The most promising system concepts shall be defined in terms of initial, broad objectives for cost, schedule, performance, software requirements, opportunities for tradeoffs, overall acquisition strategy, and test and evaluation strategy.

1. Team Member Function. For warfighting concepts that use current technology, it is the responsibility of the--

• CD to establish the user's needs and lead the capability-focused ICT.

• Materiel Developer (MD) to lead the IPT once the materiel requirement is approved.

• Functional organizations to determine the feasibility of achieving these needs.

- Test community to determine if these needs can be verified.

- Independent evaluator to plan and report on the assessment of test results against performance requirements.

However, the interaction of the above responsibilities should be an iterative IPPM process. It should be flexible enough to achieve reasonable integrated solutions to satisfy requirements.

Besides the team building, phase 0 brings into play the following typical set of problems:

The interface between the formal requirements process and the program is critical. Specifically, the interface between the MNS at the beginning and Operational Requirements Document (ORD) and System Threat Assessment Report (STAR) at the end of this phase is important. The IPPM process envisions a team approach with the CD as a key team member. One critical challenge in the application of IPPM is the effective transition from both the technology-focused IPT and the capability-focused ICT to the product-focused IPT. The team members should be capable, and empowered, to achieve an integrated solution to achieve program objectives.

Where practical, computer simulated "Virtual" prototyping should be employed to investigate performance characteristics and potential design flaws. These models and simulations should incorporate critical nonperformance parameters so meaningful tradeoffs between performance and nonperformance parameters can be accomplished. Adding these capabilities to models should make it easier to explore alternatives and seek robust designs that can tolerate future changes.

The Materiel Developer (MD), as chairperson of the product-focused IPT, should task the IPT to develop an integrated acquisition strategy. Then, the IPT should be empowered to develop the program objectives for cost, schedule, and performance for the most promising system concepts.

The test and evaluation community should be an integral part of the IPPM process. Test and Evaluation Command (TECOM), Operational Test and Evaluation Command (OPTEC), and the independent evaluator should be members of the IPT, also. They should participate in the preparation of the integrated acquisition concept and in test design. It is important that TECOM, OPTEC and the independent evaluator representatives be empowered to negotiate the necessary compromises.

During this phase, the MD, who will take the lead (will usually be the PM but may sometimes be an RDEC person), should commit to the formation of a program IPT. The recommended makeup of the team is shown in figure 2.

2. Team Composition. During this phase the make up of the IPT should generally have members from the organizational elements identified in figure 2.

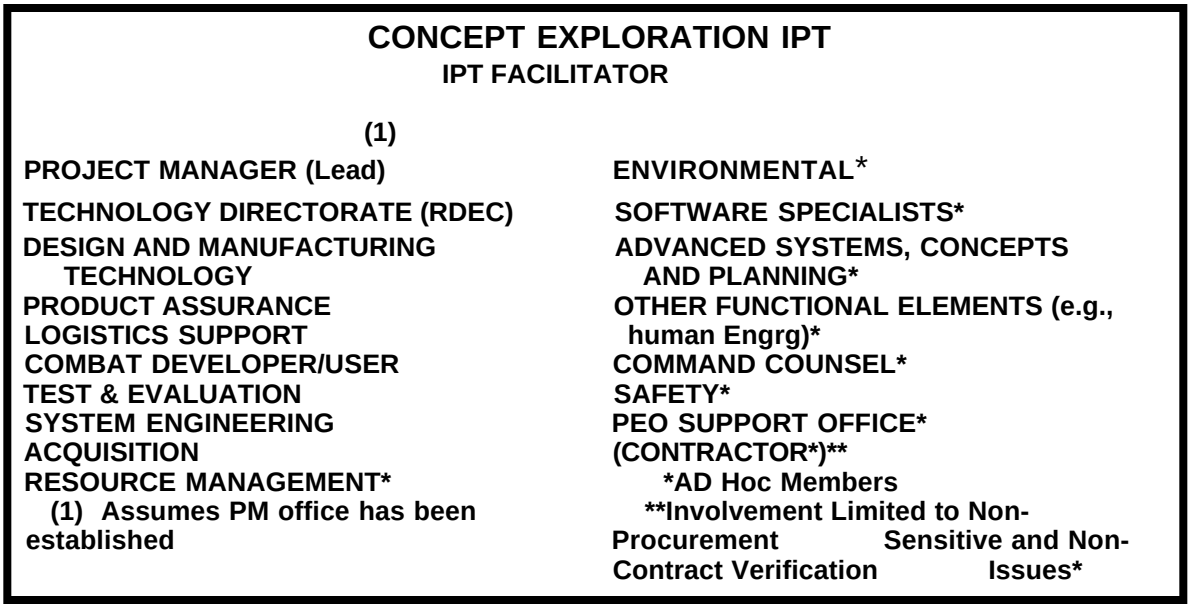

Figure 2. Concept Exploration

A Technology Expert from the appropriate RDEC serves as the IPT leader during this phase if a Program Management Office has not been established. Also, include TECOM membership in the IPT, it is essential the IPT address test issues early and assure that testability and test costs are considered.

Functions of the IPT during this phase are--

• Develop tradeoff parameters and performance estimates that should enable evaluation of alternate concepts.

• Assess simulation and performance models for their ability to effectively evaluate fully integrated design tradeoffs. Conduct system simulations to evaluate important life cycle parameters.

• Evaluate the contractors' Integrated Mast Plan (IMP) and Integrated Master Schedule (IMS) and develop an Army IMP/IMS to plan and schedule in-house activities.

• Evaluate alternate concepts against performance estimates and recommend best concept.

• Develop integrated performance baseline and integrated acquisition strategies.

The team formed during this phase should remain with the program up to sustainment and transition to Major Subordinate Command management (Level II/III). As noted previously, some changes in the makeup of the team occur as the system progresses through the various phases. However, most of the team should remain intact to assure constancy of purpose. This constancy should be assured by emphasizing traceable historical documentation and concurrent data bases within the IPT. The approach should be that the team membership will evolve and its major emphasis will change as the program transitions through the acquisition life cycle phases.

3. IPT Functions. During this phase the capability-focused ICT and technology-focused IPT further refine the analyses and concepts begun in the premilestone 0 phase. As the product-focused IPT evolves, key members from both the capability-focused ICT and technology-focused IPT begin migration to that team. After operational requirements have matured and the ORD completed, the performance goals and tradeoff criteria are refined and initial performance estimates and tradeoff parameters established. As alternate concepts are evaluated using system simulations and modeling, performance estimates and tradeoff parameters are matured. The IPT performs an assessment to determine if the design concept satisfies the user's need and the feasibility of achieving these needs. Because of this assessment, if more than one design concept is deemed viable, the IPT recommends either a multi-developmental strategy or the best design concept to develop. Operational requirements are then translated to performance requirements (performance specification) and contractual requirements (RFP). Next, the source selection criteria should be developed. Then best value analysis should be used to evaluate proposals. The IPT should be empowered to perform as the SSEB. Finally, the IPT recommends a winner and assists in the award of the contract.

The IPT develops program documents [i.e., acquisition strategy, acquisition plan, Demonstration-Validation RFP, Demonstration-Validation source selection plan, draft Integrated Master Plan (IMP), draft Integrated Master Schedule (IMS), and draft Test and Evaluation Master Plan (TEMP)], verifies the documents are consistent and prepares a draft integrated acquisition strategy.

After contract execution the IPT performs integrated performance reviews of the contractor's efforts to finalize the design and life cycle process concepts. These reviews should verify performance requirements compliance of potential design concepts by using model and simulations, test and experimentation results, and tradeoff analyses. The IPT uses a

Cost and Operational Effectiveness Analysis (COEA) to assist in the evaluation of design concept(s). Finally, the IPT evaluates and recommends the winning design concept(s).

The IPT develops the program baseline by performing a risk assessment, establishing performance goals, developing a realistic program schedule, and generating cost estimates. Next, the IPT verifies the accuracy of program documents; updates Integrated Acquisition Program and ORD, if required; and prepares the Milestone I Decision Package.

4. WORKSHEET II, Concept Exploration, Phase 0.

WORKSHEET II - CONCEPT EXPLORATION, Phase 0.

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Form IPT and evaluate MNS/ORD.		
• Develop perforamce estimates and trade off parameters		
• Conduct system simulations		
• Assess the potential of alternate concepts to counter the threat or to provide a potential warfighting advantage. •• Analyze and evaluate the results from in-house simulations in terms of these tradeoff parameters. •• Conduct market analysis to evaluate applicability of existing items. •• Use the results of this analysis, together with the information on parameters not explicitly covered in the simulations, to recommend which of the proposed concepts a should be pursued further.		
• Select best concepts by identifying potential consequences of the alternative (s).		
• Propose an acquisition strategy for the most promising alternative(s).		
• Propose program specific exit criteria that should be accomplished during Phase I, Demonstration and Validation.		
• Develop the performance specification and integrated RFP. •• Consider all the functional area requirements from		

APPROACH:	SUPPORT SOURCE:	SCHEDULED
systems engineering, value-added and tradeoff analyses. •• RFP must explicitly state that contractors are allowed and encouraged to propose alternatives to any RFP requirement and product improvements to the product performance specifications. •• Requirements must be based on performance needs rather than stipulating design parameters and “how to” requirements.		
Empower team as SSEB and complete Best Value Analysis. •• Assess Contractor's systems engineering capability along with procedures, data, facilities, personnel and tools. •• Analyze the contractor's process for identifying, and selecting from among, alternate solutions. •• Contractor's IMP/IMS is response to RFP and forms the basis for contractual application of systems engineering and •• Is used in the source selection process, •• Identifies the process for - requirements analysis, - functional - analysis/allocation - synthesis, - systems analysis and control. •• Identifies a risk management program.		
Identify the characteristics which are critical to the verification of verification of people, product,and		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPETITION:
process solutions. The associated risks are included in risk management effort.		
• Establish a partnering relationship with contractor(s).		
• Technical reviews are structured as a demonstration of the contractor's achievement of required accomplish-ments measured by appropriate technical performance measurements and exit criteria. The contractor's demonstrations shall-- •• Confirm the effect of risk reduction measures and assumptions in quantifying risks, •• Address relationships, interactions, interdependencies, and interfaces of systems and system elements, •• Confirm requirements and objectives, technical performance, and measurements technical plans are being tracked, on schedule, and are achievable. •• Confirm that continued development is warranted.		
• Finalize design concept.		
• Update/Draft acquisition documents, e.g., Acquisition Plan & Strategy.		
• Evaluate and select concepts to develop program baseline including risk assessment, program schedules and cost estimates.		
• Prepare MS I Decision Package.		

C. PROGRAM DEFINITION AND RISK REDUCTION, PHASE I

During this phase, the program shall become defined as one or more concepts, design approaches, and/or parallel technologies are pursued as warranted. Assessments of the advantages and disadvantages of alternative concepts shall be refined. Prototyping, demonstrations, and early operational assessments shall be considered and included as necessary to reduce risk so that technology, manufacturing, and support risks are well in hand before the next decision point. Cost drivers, life cycle cost estimates, cost-performance trades, interoperability, and acquisition strategy alternatives shall be considered to include evolutionary and incremental software development.

1. Team Composition. During this phase the makeup of the IPT should generally consist of the same members identified in figure 2.

2. Team Member Functions. This phase of the program introduces the following additional challenges:

- The ability to perform truly integrated product demonstrations is an essential program responsibility. Segmented functional demonstrations, i.e., reliability, electromagnetic, maintainability, etc., can inhibit the effective practice of IPPM by the contractor. Segmented demonstrations imply an isolated "stovepipe" approach to system development, while the use of integrated demonstrations implies a concurrent approach to system development.

- If the system is approved at milestone I for further Program Definition and Risk Reduction, the IPT will assist the MD in the execution of his/her program. The makeup of the team is unchanged from the previous phase.

Team functions during this phase are to--

- Assist the MD and the contracting officer in the monitoring and execution of the contract.

- Evaluate the designs developed by the contractor(s) using in-house simulation and other tools. This evaluation should also include an assessment of the means of handling future disposal. Also, product processes planned for the design should not create environmental contamination.

- Analyze demonstration/test results, simulation results and recommend approval of inputs to the CD COEA.

- Perform an affordability/value-added analysis to assure that all aspects of life cycle cost have been adequately addressed.

- Validate the realism of the resources available to the program and recommend to the MD program adjustments needed to assure that all life cycle issues are properly addressed during this phase.

• Recommend what changes in the requirements should be made to assure a balanced program that meets all essential life cycle needs. These recommendations include both technical changes to the performance specification and changes in the user requirements. DODI 5000.2 makes clear provision for the evolution of the requirement from a broad statement of need, the MNS, to refinement of the ORD. The CD-lead, capability-focused ICT and later the product-focused IPT and its CD member are the means to carry out this process. The ability to achieve integrated solutions as demonstration and simulation results emerge is the key. This is a critical reason to retain the CD as a key player in IPPM.

• Update the integrated acquisition program developed during the prior phase to finalize the RFP and source selection plan for Engineering and Manufacturing Development (EMD), and to incorporate changes flowing from tradeoffs/requirement changes.

• Analyze Integrated Logistics Support (ILS) plans and assess whether they are adequate to assure successful fielding. The team should advise the MD of the likelihood of successful deployment.

The focus of the team is on assuring that the RFP and the performance specification for EMD contain the proper requirements. Also, all essential life cycle functions must be covered appropriately. These assurances are achieved by--

• Seeking a balance among these requirements.

• Assuring that both technical and management risks are properly covered.

If the assurances are successfully accomplished, then a credible milestone II decision package should be created.

After issuance of Demonstration-Validation RFP, the IPT performs a best value analysis to evaluate the proposals. Next, the IPT recommends a winner and assists in the award of the contract. After contract execution the IPT performs integrated performance review(s) of the contractor's Demonstration-Validation concept. These reviews should verify performance requirement compliance of the design by using model and simulations, test and experimentation results, and tradeoff analyses. If the integrated performance review is satisfactory, the IPT recommends the contractor be authorized to begin fabrication of demonstration hardware.

Upon completion of the demonstration hardware, a contractor demonstration is performed. The IPT analyzes the results of this demonstration and updates the COEA, the tradeoff parameter and the system simulation program(s). Also, the IPT performs an impact analysis. If Integrated Acquisition Program and/or the Program Baseline are affected, then the IPT updates the program baseline by performing a risk assessment, by revising the performance goals, by changing the program schedule, and by correcting the cost estimates; and updates the program documents; updates Integrated Acquisition Program and ORD, if required; and prepares the Milestone II Decision Package.

3. WORKSHEET III, Phase I. Worksheet III identifies some IPT functions and best value practices that should be addressed during Program Definition and Risk Reduction.

WORKSHEET III - Program Definition and Rick Reduction, Phase I.

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Review Program Definition and Risk Reduction RFP. •• Validate system threat assessment.		
•• Identify major cost, schedule and performance tradeoff opportunities •• Verify program specific exit criteria are being achieved during this Phase. •• Army IPTs are used to prepare integrated system performance specification and contract statement of work. •• Interchangeability and interoperability criteria are clearly shown as contractual requirements to be controlled by Army. •• Use commercial standards for software development management tasks and processes to extent possible. •• System performance specifications are used instead of detailed product specifications. Interface control requirements are included in specification. ••• Army essential requirements are defined based on performance characteristics. ••• System performance specifications are used instead of detailed product specifications. Interface control requirements are included in specification. ••• Performance specifications are supplemented with drawings and process control specifications, if needed to fully define item. ••• Performance specifications are required to the lowest work breakdown structure selected for breakout.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
••• Commercial drawings are used to the maximum extent possible. Performance specifications take precedence over drawing package, generally provided as advisory only. ••• Performance specifications are supplemented with drawings and process control specifications, if needed to fully define item. ••• Performance specifications are required to the lowest work breakdown structure selected for breakout. ••• Commercial drawings are used to the maximum extent possible •• Ensure that radiological requirements and constraints included in development baseline, including methods to determine compliance. •• Ensure that safety engineering requirements are included in the development baseline, along with methods of determining compliance. •• Tailor packaging requirements to end use of package. Best commercial packaging processes that meet needs are allowed. •• Integrate manufacturing and producibility design considerations during development through IPPD concepts.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED
•• Ensure Manpower and Personnel Integration (MANPRINT)/Human Factors Engineering requirements are included in the development baseline, along with methods of determining compliance. •• In the Statement of Work (SOW) require the contractor, in his/her response to the Request For Proposal, to describe his/her Value Engineering Action Plan for the contract using DOD Handbook 4245.8H as a guide. •• Provide for contractor's use of commercial and international standards and practices for assuring product quality.		
• Contractor is required to describe planned IPPM process and all relevant previous experiences in response to request for proposal. Progress assessed at periodic integrated reviews.		
• Contractor retains design responsibility throughout contract. Army does not "approve" design status at design reviews, but establishes exit criteria, monitors progress, and serves as member(s) of the IPT.		
Prime contractor describes configuration management system in response to RFP.		
Contractor is required to describe approach to preventing and controlling environmental hazards in system development and production in response to RFP.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Contractor drawings and specifications are used for reviewing nonstandard parts requested.		
• Army degree of control determined through evaluation of overall contractor management capabilities through past performance evaluation in source selection.		
• Minimize separate functional planning conferences by including progress reporting in periodic integrated reviews.		
• Type of reviews, reports, management structure tailored to contract purpose, type and value.		
• Army participates in contractor validation and verification activities to avoid separate Army inspections.		
• Use simulation in development to combine and reduce testing.		
• Identify the characteristics that are critical to the verification of people, product, and process solutions. The associated risks are included in risk management efforts.		
• Consider a partnering relationship with contractor(s). •• Parts Control provisions should be tailored to ensure an adequate parts control program. •• Electromagnetic (EM) testing is integrated within the overall contractor testing program.		
• Finalize Demonstration/Validation Concept.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Fabricate demonstration hardware.		
• Analyze results of demonstration. •• Evaluate tradeoff parameters, system simulations. •• Perform COEA update.		
• Evaluate impact on program baseline.		
• Update program documents for EMD to include Acquisition Strategy, Acquisition Plan, EMD, RFP, IMP/IMS, TEMP, ILSP and ORD as necessary.		
• Update and revise integrated program summary per DOD 5000.2M.		
• Prepare Milestone 2 Decision Package.		

D. ENGINEERING AND MANUFACTURING DEVELOPMENT, PHASE II

The primary objectives of this phase are to: translate the most promising design approach into a stable, interoperable, producible, and cost effective design; validate the manufacturing or production process; and, demonstrate system capabilities through testing. Low Rate Initial Production (LRIP) occurs while the Engineering and Manufacturing Development phase is still continuing as test results and design fixes or upgrades are incorporated.

1. IPT Composition. The general composition of the IPT is presented in figure 3.

2. Team Member Functions. Successful entry into the EMD phase requires meeting the exit criteria from Phase I. During Phase II, the IPT's goals should transition to readiness for production and deployment. The IPT function continues from Demonstration-Validation. During Phase II, preproduction qualification testing and, where appropriate, live fire testing are conducted to provide data for the full-rate production decision.

The IPT provides the functional leadership for the management of the multidisciplinary acquisition processes. This is accomplished through the matrix relationship with the Army program management office. The IPT is the catalyst for the free and open exchange of information as discussed in Section III-B, The Partnering Process - Industry/Army. The functions of the IPT during Phase II should be tailored to the specifics of the program by the MD. These functions should include, but are not limited to--

• **Providing assistance to the contracting officer in the selection of the EMD contractor.** Normally the team should be on the SSEB and should assure that other members of the SSEB act consistently with the intent of the program as agreed to by the team members.

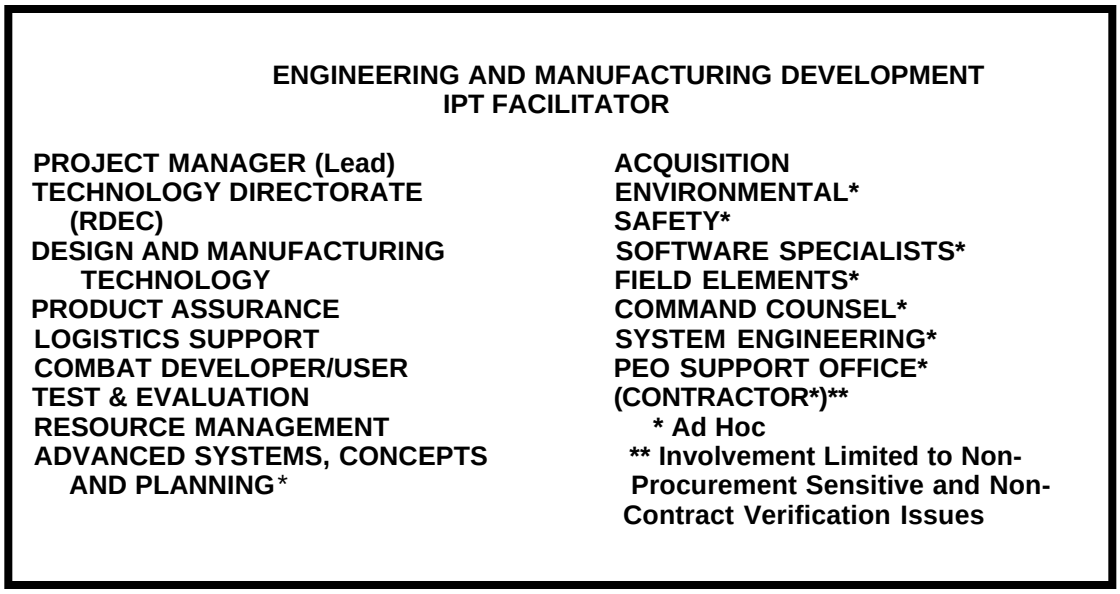

Figure 3. Engineering and Manufacturing Development, Phase II.

• **Perform an integrated assessment of contractor performance.** The baseline for this function is for the contractor to show progress toward achieving contractual requirements. The Army assessment and evaluation of the contractor's demonstrated progress should not include an "approval" of the contractor's results or design. Responsibility for the design should remain with the contractor during this process. A balanced integrated team approach should be taken to observe contractor's progress demonstration during critical design reviews, production readiness reviews and other similar reviews. If this is not done the contractor may abandon or seriously compromise his/her own IPPM approach to accommodate the Army. If this happens a truly integrated design is lost.

• **Validate the technical baseline.** The IPT and the contractor team should evaluate results to determine the validity of the system design baseline. All information sources should be used early, and continuously interrogated. Information sources are both formal and informal. These include in process and design reviews, periodic team meetings, results of testing, vendor/subcontractor information, the availability of improved or new technology, in materials, design practices, manufacturing processes and equipment. The IPT should maintain a technical vigilance, in partnership with the contractor, to make certain that the system design will meet all or the life cycle requirements.

• **Reassess value.** The IPT should become an advocate for the application of functional analysis methodology in the design tradeoff processes. This should result in best value for the functions of the design elements considered as a part of the initial design appraisal. The leverage to reduce or eliminate the top cost drivers are significantly greater during the initial design than using similar methods for Phase III redesign.

• **Reassess resource realism.** The IPT should evaluate the program impact of resource reduction. This evaluation should include a risk analysis. If the resource reduction results in unacceptable risk, the IPT and contractor team should recommend to the program manager, the degree of baseline modification necessary to manage that risk.

• **Validate test readiness.** The IPT should assist the MD in the integrated test readiness review. Throughout this phase, the team should emphasize the realism of the tests to be performed at the end of the EMD phase. The IPT, with the contractor team, should accomplish a comparison of the proposed tests. This assessment should compare the detailed test parameters with the technical progress as reflected in early contractor testing and simulation results. The IPT should inform the MD of the probability for success, before testing, for both technical and operational requirements.

• **Validate production readiness.** The program planning should integrate production readiness evaluations with the ongoing determinations of the viability of design progress. Consequently, the dedicated production readiness review revisits and confirms the results and actions taken from all prior in-process meetings on this topic. The IPT should be proactive throughout all phases of the program, to ensure that the contractor partnership integrates production/process factors with design tradeoffs. The IPT should maintain an independence and objectivity to ensure that the MD has realistic results from this production readiness evaluation. When the system is ready for production, it should meet all life-cycle baseline requirements. Consequently, this evaluation cannot be limited to production issues, but also the interrelationships of performance of the system, with performance and control of production processes. There are other life cycle requirements (e.g., design stability, process proofing and process control, production capability, materials and vendor control, environmental management, field support and disposal planning) and Army functions planned. The review should be tailored to the system being evaluated and include a detailed assessment of Phase II results against the Phase II exit criteria.

• **Update the integrated program summary.** If resources or other important parameters have changed, the team should recommend needed changes in this set of documents.
Successful application of IPPM should result in a defensible Milestone III decision package.

After issuance of the EMD RFP, the IPT performs a best value analysis to evaluate the proposal. Next, the IPT recommends a winner and assists in the award of the EMD contract.

After contract execution the IPT performs integrated performance review(s) of the contractor's EMD efforts. These reviews should verify performance requirements compliance of the preliminary system design by using model and simulations, test and experimentation results, and tradeoff analyses. If the inte- grated performance review is satisfactory, the IPT recommends the contractor be authorized to begin development of the detailed de- sign, to fabricate components, and to perform component testing.

The IPT analyzes the results of these component tests and an determines system test readiness. If the system is ready, system tests are performed. The IPT then analyzes the results of the system tests and determines the final EMD system performance. Next, the IPT determines if the EMD system is ready for production and if ILS planning is adequate. If the Integrated Program Summary and/or the Program Baseline are impacted, then the IPT should update the program baseline. This should be accomplished by performing a risk assessment, by revising the performance goals, by changing the program schedule, and by correcting the cost estimates. The IPT should also update the program documents and the Integrated Program Summary, if required. Next, the IPT should prepare the Milestone III Decision Package.

3. Worksheet IV, Phase II. WORKSHEET IV identifies some IPT functions and best value practices that should be addressed during Engineering and Manufacturing Development.

WORKSHEET IV - Engineering and Manufacturing Development, Phase II

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Review EMD RFP.		
• Validate system threat assessment.		
• Verify program specific exit criteria are being achieved during this phase.		
• Army IPT is used to prepare integrated system performance specification and contract statement of work.		
• Army essential requirements are based on performance characteristics rather than detailed technical data package (TDP). Performance specifications take precedence over drawing package, generally provided as advisory only.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
•• Performance specifications are supplemented with drawings. •• Performance specifications are required to the lowest work breakdown structure selected for breakout. Breakout decision is integrated part of design process. •• Commercial drawings are used to the maximum extent possible.		
• System performance specifications are used instead of detailed product specifications. Interface control requirements are included in specification.		
• Contractor(s) is/are required to maintain the TDP for the life of the contract.		
• Prime contractor describes configuration management system in response to RFP. Configuration management plan not required.		
• Interchangeability and interoperability criteria are clearly shown as contractual requirements to be controlled by Army.		
• Use commercial standards for software development management tasks and processes to extent possible. •• Confirm that continued development is warranted.		
• Software development: •• Contractor is required to perform testing. •• Contractor provides software support for duration of development		
and production contracts. Support is transitioned to Army upon completion of production. •• Software development and support status is included in periodic integrated reviews.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Tailor Reliability, Availability and Maintainability (RAM) program tasks to characteristics of acquisition (Commercial, NDI, development, production, sole source, competitive). •• Require contractor to describe the tasks needed to meet RAM requirements in response to RFP. Do not require an RAM plan. •• Analyze during past performance evaluation reliability acquisition test data on similar system manufactured by contractor to reduce testing on system being procured. •• Hold contractor responsible for meeting RAM requirements. Do not approve plans and reports. Do not hold separate RAM reviews. •• Include RAM status in periodic integrated reviews.		
• Safety engineering requirements: •• Ensure that Specific safety engineering requirements are included in the system performance specification, along with methods of determining compliance. •• Contractor is not required to prepare program plans. Safety engineering status and any special assessments are presented at periodic integrated reviews.		
• Environmental requirements: ••Specific environmental requirements are in system performance specification, including methods if determining compliance. •• Status of environmental engineering is addressed at periodic integrated reviews. •• Specific transportability requirements are in system performance specification, including methods of determining compliance. Do not require program plan.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Packaging and transportability requirements: •• Specific package requirements are in system performance specification, including methods of determining compliance. Do not require program plan. •• Tailor packaging requirements to end use of package. Best commercial packaging processes that meet needs are allowed. •• Packaging and transportability engineering status is included in periodic integrated reviews.		
• Manufacturing and producibility requirements: •• Integrated manufacturing and producibility design considerations during development through IPPD concepts. •• Do not require producibility engineering planning or manufacturing program plans. •• PEO/PM approves production readiness review results and		
assessments. •• Ensure that producibility and manufacturing planning status included in integrated reviews.		
• MANPRINT/Human Factors engineering requirements: •• Ensure that specific MANPRINT/ Human Factors engineering requirements are included in the system performance specification, along with methods of determining compliance. •• Do not require contractor to prepare program plan. •• Ensure that MANPRINT/Human Factors engineering status is presented at periodic integrated reviews.		
• Ensure that specific radiological requirements and constraints included in system performance specification, including methods to determine compliance.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Tailor integrated support planning requirements to the support concept specified in acquisition strategy.		
• Tailor the requirements for delivery of Logistics Support Analysis Records and the analysis performed based on the logistics products required to support the system.		
• Tailor support concept to the acquisition strategy.		
• Contractor required to describe: •• Planned IPPD process and all relevant previous experiences in response to request for proposal. Progress assessed at periodic integrated reviews. •• Approach to preventing generation of or to controlling of environmental hazards in system development and production in response to RFP. •• Include Value Engineering (VE) in contracts, require contractor to provide corporate VE policy as part of proposal. •• Past performance of integrated support planning in response to request for proposal. Tailor requirements for plans, reviews and reports to contractor's capability. •• Past performance of provisioning in response to request for proposal. Tailor requirements for plans, reviews and reports to contractor's capability. •• Past performance of maintenance training course development in response to request for proposal. Tailor requirements plans, reviews and reports to contractor's capability.		
• Reduce separate functional support planning conferences by including progress reporting in periodic integrated reviews.		
• Use commercial off-the-shelf manuals to maximum extent possible.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Use joint contractor/Army validation.		
• Use continuous evaluation to integrate and reduce testing.		
• Use simulation in development to combine and reduce testing.		
• Use statistical process control to reduce in-process inspections and tests.		
• Utilize available test facilities rather than construction of new facilities.		
• Development requirements: •• Design to cost considerations are integrated with design engineering efforts. •• Functional reviews are integrated and scheduled concurrently with prime contractor management reviews. •• Prime contractor maintains configuration control and status accounting through best commercial practices throughout contract. •• Army maintains control of system performance specifications. •• Functional Configuration Audit key measure of contractor compliance with performance specification requirements to be controlled by the Army.		
• Contractor drawings and specifications are used for reviewing nonstandard parts requested.		
• Electromagnetic Effects (EM) requirements are included in system performance specification, including methods of determining compliance. Program plans are not required. •• Testing is integrated within the overall contractor testing program. •• Status is addressed at periodic integrated reviews.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Special support and test equipment requirements: •• Are integrated in systems engineering effort. Same design and documentation processes are used. •• Equipment is used to the maximum possible extent. •• Are included in system performance specifications. Contractor given total responsibility for design, documentation, testing and control. •• Army investigate special support and test equipment status at periodic integrated reviews. •• Army investigate special support and test equipment status at periodic integrated reviews.		
• Army participate in contractor validation and verification activities to avoid separate government inspections.		
• Army degree of control determined through evaluation of overall contractor management capabilities through past performance evaluation in source selection.		
• Type of reviews, reports, management structure tailored to contract purpose, type and value.		
• Management information from Army auditors and contract administers is not duplicated by other Army support.		
• Army IPPM teams are formed and are required to conduct integrated reviews of contractor's progress as a body. Separate functional reviews may be used as input to the IPT.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Test and evaluation preparation: •• Involve the Army development tester and evaluator up front in the preparation of the acquisition strategy and on the IPT. •• Test integration is accomplished within the boundaries of the periodic integrated reviews.		
• Quality Assurance: •• Do not require a Quality Assurance Program Plan. Have contractor describe quality approach in response to RFP. •• Evaluate contractor's past quality performance in source selection. •• Provide for contractor's use of commercial and international standards and practices for assuring product quality.		
System Engineering: •• Assess Contractor's systems engineering capability. Contractor's demonstration along with procedures, data, facilities, personnel, and tools shall be investigated to identify risk of achieving required accomplishments. •• Analyze the contractor's process for identifying, and selecting from among alternative solutions. •• Contractor's IMP/IMS is to be submitted in response to the RFP and forms the basis for contractual application of systems engineering and ••• Is used in the source selection process, ••• Identifies the process for: - requirements analysis, - functional analysis/ allocation, - synthesis, - systems analysis and control. ••• Identifies a risk management program.		
• Identify the characteristics which are critical to the verification of people, product, and process solutions. The associated risks are included in risk management efforts.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Technical reviews are structured as a demonstration of the contractor's achievement of required accomplishments measured by appropriate technical performance		
measurements and exit criteria. The contractor's demonstrations shall: •• Confirm the effect of risk, reduction measures, assumptions in quantifying risks are addressed. •• Address relationships, interactions, interdependencies, and interfaces of systems and system elements.		
• Confirm requirements and objectives, technical performance measurements, and technical plans are being tracked, on schedule, and are achievable. •• Confirm that continued development is warranted.		
• Prepare Milestone 3 Decision Package.		

E. PRODUCTION, FIELDING/DEPLOYMENT, AND OPERATIONAL SUPPORT, PHASE III

The objectives of this phase are to achieve an operational capability that satisfies mission needs. Deficiencies encountered in Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E) shall be resolved and fixes verified. The production requirement of this phase does not apply to ACAT IA acquisition programs or software-intensive systems with no developmental hardware components. During fielding/deployment and throughout operational support, the potential for modifications to the fielded/deployed system continues.

1. IPT Composition. The IPT composition should remain similar to the EMD, Phase II, makeup except that Advanced Systems should no longer participate and the Technology Directorate would become an ad hoc member.

The IPT's makeup should evolve to focus on system sustainment. If the threat changes or a new requirement emerges, the team may have to be reconstituted to assist the MD in the development of a proposed modification.

Assuming successful deployment of the system, then the team composition, as shown in figure 4, would change as follows--

• The lead would pass from the MD to the materiel management organization.

• The systems engineering organization moves from an ad hoc member to full membership in recognition of its design responsibilities.

• The advanced systems become ad hoc member and the technology office will no longer participate.

• OPTEC/TECOM, except for programs requiring stockpile reliability or lead the fleet testing, and Combat Developer moves from full member to ad hoc member.

This team composition assumes that the system will remain in this phase and that there will be no major system upgrades.

2. Team Member Functions. The IPT should assist the MD in the determination if a system is ready for deployment and should assist the MD in performing the following configuration management support functions:

• Coupled with use of the performance specification; a contractor, where certified by AMC Pamphlet 715-16, Program for Continuous Process Improvement, should retain control of the system configuration throughout the development and/or production of the system. The Army reserves the right of access to the approved design. If competition is planned for production, a long-term engineering support contract should be established with the development contractor to allow for technical data maintenance and upkeep.

• When the performance specification is of the type(s) described in AMC Pamphlet 715-17, Guide for the Preparation and Use of Performance Specifications, the MD should retain control of those changes that effect form, fit, function and interchangeability requirements of the performance specification.

• The MD should have the option to require contractors to deliver a current drawing package with the right to procure materiel including software in the competitive market, using the same performance requirements as the prime contractor does with its subcontractors.

• The MD should use interchangeability and interoperability criteria. This should assure that contractor changes made to improve th system do not negate support for systems produced earlier or render obsolete the spares and repair parts already in the support system without a performance/support cost assessment.

• To verify configuration, there should be requirements for a Functional Configuration Audit to be performed. Under a performance specification approach, the MD's primary requirement becomes the performance of the system (i.e., Does it meet the requirements of the specification?). Therefore, a Physical Configuration Audit may be limited to only form, fit, and interface requirements.

The functions of the team are similar to those of the prior phase and should not be repeated here. However, there are several points that deserve emphasis--

- The update of the technical performance baseline should be in the form of an investigation/validation of engineering change proposals (ECP).

- The team should verify compliance with exit criteria for entering Production, Fielding/Deployment, and Operational Support phase has been achieved and determine supportability of materiel.

- The integrated view of the IPT should assure that ILS, readiness and disposal issues are considered along with continued emphasis on performance and producibility issues during this phase.

- The readiness of the system and continued review of ECPs to assure that the system will remain effective during deployment and can be safely and economically disposed of.

If the team sees that the design is not stabilizing, then they should recommend appropriate changes to the acquisition program. These changes should strive to achieve an acceptable risk for the next phase of the program.

After issuance of the production RFP, the IPT performs a best value analysis to evaluate the proposal. Next, the IPT recommends a winner and assists in the award of the production contract. After the production contract has been awarded and system fabrication begins, the IPT verifies the adequacy of the logistics support program. Once the first article is produced, testing begins to determine performance compliance. Where performance deficiencies are identified which require engineering changes, the IPT should evaluate these proposed changes and determine their disposition.

When all known deficiencies have been corrected and the system is deemed ready for deployment, the IPT performs a Deployment Readiness Review to ascertain the system's deployable status. If the IPT determines the system is deployable, then deliveries of the system and required spares should be defined. After initial deployment of the system, the IPT performs a System Readiness Review to determine final system adequacy. If performance deficiencies are identified which requires engineering changes, the IPT should evaluate these proposed changes. Once the system is deemed to have satisfied all contractual performance requirements, the system should be fully deployed.

If the team and ultimately the MD determine that after fielding/deployment an upgrade is both practical and affordable, then the focus would shift to the creation of a new integrated program for that upgrade and the associated milestone IV decision package. In that event the program effectively cycles back to either Demonstration-Validation phase or EMD and the team and its functions are reconstituted accordingly.

Throughout the life of a system, periodic System Performance Reviews should be held to determine if the system is still meeting its mission need. If a new threat or requirement is identified, then the IPT should determine if an upgrade to the system is technically and affordably feasible or if an entirely new system is required. Where the existing system can be modified, the IPT should be reconfigured and the program should reenter the development process at the EMD phase.

If no new threat or requirement is identified and the system is satisfying existing mission needs, then the existing IPT should continue to monitor the system's readiness. Once it is determined that the system no longer meets its intended mission and it cannot be economically modified to meet its mission, then the system should be disposed of. The final responsibility of the IPT is to assure the system is being disposed of in a safe and environmentally harmless manner.

3. Worksheet V, Phase III. WORKSHEET V identifies some IPT functions and best value practices that should be addressed during Production, Fielding/Deployment, and Operational Support.

WORKSHEET V - Production, Fielding/Deployment, and Operational Support, Phase III

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Establish a partnering relationship with contractor(s).		
• Review Production, Fielding/ Deployment, and Operational Support RFP. •• Validate the system threat assessment and the performance objectives and thresholds. •• Determine if projected life-cycle costs and annual funding requirements are affordable in the context of long-range investment plans or similar plans. •• Confirm test results and low- rate production provide reasonable assurance that the design is:		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
••• Stable, operationally acceptable, logistically supportable, and ••• capable of being produced efficiently. •• Army essential requirements are defined on the basis of performance characteristics rather than detailed technical data package (TDP). Performance specifications take precedence over drawing package, generally provided as advisory only. ••• Performance specifications are supplemented with drawings and process control specifications, if needed to fully define item. ••• Commercial drawings are used to the maximum extent possible. •••Data Package (TDP) required to support breakout and spares procurement. Has option to take delivery of contractor's drawing package, if required. •• Software management: ••• Ensure utilization of commercial standards for software management tasks and processes to maximum extent possible. ••• Place software responsibility with the contractor. •• Do not require producibility engineering planning or manufacturing program plans. •• In the SOW require the contractor, in his/her response to the Request for Proposal, to describe his/her VE Action Plan for the contract using DOD-HDBK-4245.8H as a guide.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
•• Electromagnetic (EM): ••• EM testing is integratedwithin the overall contractor testing program. ••• EM status is addressed at periodic integrated evaluations. •• Logistics Support: ••• Tailor the requirements for delivery of Logistics Support Analysis Records documentation based on contractor's demonstrated capability to perform analysis. ••• Utilize commercial off-the-shelf manuals to maximum extent possible. ••• Evaluate contractor's past performance in source selection. •• Quality Assurance: ••• Do not require a Quality Assurance Program Plan. Have contractor describe quality approach in response to RFP. ••• Provide for contractor's use of commercial and international standards and practices for assuring product quality. Do not specify MIL-Q-9858. ••• Do not specify inspection equipment and sampling plans as contract or specification requirements.		
• Contractor required to describe planned IPPD process and all relevant previous experiences in response to request for proposal. Progress assessed at periodic integrated functional reviews.		
• Contractor(s) is/are required to maintain the Technical Data Package for the life of the contract.		
• Prime contractor describes configuration management system in response to RFP. Configuration management plan not required.		
• Contractor is required to perform software verification and quality assurance functions. Army does not perform independent verification and validation of contractor software testing.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Contractor provides software support for duration of production contracts. Support is transitioned to Army upon completion of production.		
• Require contractor to describe the tasks needed to meet RAM requirements in response to RFP. Do not require a RAM plan.		
• Require contractor to describe his/her past performance of: •• Provisioning in response to RFP. Tailor requirements for plans, reviews, and reports to contractor's capability. •• Maintenance training course development in response to RFP. Tailor requirements for plans, reviews and reports to contractor's capability.		
• Analyze potential environmental consequences of the program and develop appropriate mitigation measures.		
• Army maintains control of system performance specifications.		
• Determine if adequate resources (people and funds) to support production, deployment and support have been programmed.		
• Army oversight and documentation requirements are tailored to maturity level if contractor's software capability.		
• Periodic integrated reviews also include: •• Software support status. •• RAM status. •• Producibility and manufacturing planning status. •• Investigation of special support and test equipment status.		
• PEO/PM approves Production Readiness Reviews results and assessments.		
• Utilize joint contractor/Army validation.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Army participate in contractor validation and verification activities to avoid separate Army inspections.		
• Degree of Army control determined through evaluation of overall contractor management capabilities through past performance evaluation in source selection.		
• Type of reviews, reports, management structure tailored to contract purpose, type, and value.		
• Management information from Army auditors and contract administers is not duplicated by other Army support.		
• Army IPPM teams are required to conduct integrated reviews of contractor's progress as a body. Separate functional reviews may be used as input to the IPT.		
• Utilize continuous evaluation to integrate and reduce testing.		
• Utilize statistical process control to reduce in-process inspections and tests.		
• Utilize available test facilities rather than construction of new facilities.		
• Test integration is accomplished within the boundaries of the periodic integrated reviews.		
• Use process capability and stability to reduce or eliminate inspection.		
• Use continuous evaluation of process results to reduce in-process and final acceptance testing.		
• Analyze the contractor's process for identifying, and selecting from among alternative solutions.		

APPROACH:	SUPPORT SOURCE:	SCHEDULED COMPLETION
• Identify a risk management program.		
• Confirm the effect of risk, reduction measures, assumptions in quantifying risks are addressed.		
• Confirm requirements and objectives, technical performance measurements, and technical plans are being tracked, on schedule, and are achievable.		
• Update configuration baselines.		
• Verify attainment and maintenance of required performance characteris-tics and capabilities.		
• Perform sustainment duties such as-- •• Preparing Operator’s and Maintenance Manuals. •• Acquire spare parts, as required. •• Reorder major systems, etc.		
• Evaluate conduct of service life extension programs.		
• Consider a partnering relationship with contractor(s).		

The proponent of this pamphlet is the United States Army Materiel Command. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to the Commander, HQ AMC, ATTN: AMCRDIEC, 5001 Eisenhower Avenue, Alexandria, VA 22333-0001.

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APPENDIX A

EXAMPLE OF CONTRACT LANGUAGE

The information provided in this appendix applies to developmental procurement. Tailoring for each procurement is necessary.

Sample Wording and Topics for Executive Summary

In the spirit of Acquisition Reform the Government should not mandate processes, however, offerors should be aware that the Government intends to manage this program using IPPM concepts. Listed below are some other techniques which the Government feels are valuable:

The use of commercial products, processes, and practices.

The integration of functional disciplines, i.e., system engineering, software engineering, hardware engineering, integrated logistics support, manufacturing, and production.

Use of IPTs in the design (hardware and software), test, quality, logistics support, production, and management processes to ensure the capability of sustaining production and readiness rates.

Employ safety, performance and human engineering processes to ensure a quality product for the user.

Use of periodic reviews to monitor progress towards complying with contractual requirements, i.e., identification of critical events/actions inherent to the completion of the project.

Sample SOW language for IMP and IMS

***Integrated Master Plan (IMP**). You shall implement, manage to, update, and maintain the contract IMP. You shall develop XYZ in accordance with this IMP. The IMP shall be used throughout the contract as a management tool to assess progress and determine success in achieving program requirements. You shall be required to report on work in progress in accordance*

with the IMP at each program review, at selected technical reviews and at government discretion.

Integrated Master Schedule (IMS). *You shall develop, implement, manage to, update, and maintain the Contract IMS. All contractor schedule information delivered or presented at program reviews shall originate from the IMS. The IMS shall be fully automated. It shall be traceable to the IMP and shall contain all critical events, accomplishments, and criteria, predecessors and successors, and their dependencies. The IMS*

shall address total (program name) activities (define activities) for all prime contractor and major subcontractors. The contractor shall conduct critical path analyses of the tasks and report problem areas and corrective actions required to eliminate/reduce schedule impact. (DI-MISC-81183)

Sample Language for Section L

Definition:

***IMP: Integrated Master Plan**--an events driven plan delineating the work effort by establishing significant accomplishments that must be completed prior to an event and the criteria that support successful completion of each accomplishment.*

***Integrated Master Plan (IMP).** The Offeror shall provide an IMP as part of their proposal submittal. The IMP shall expand on the required work effort defined in the SOW tasks. The IMP shall be event-oriented and represent integrated product development (encompassing all functional disciplines, and customer involvement) of the WBS elements. Each event marks the initiation/conclusion of major intervals of program activity. The IMP is not a schedule (no calendar dates are indicated), but it is a list of events, significant accomplishments, and associated completion criteria which describe the work effort necessary to develop a product which meets contract requirements.*

Each acquisition will have to tailor the specific requirements/sections that the offerors will provide information on as part of their proposal. Examples of topics that may be important include:

EVENT

- *The transition point between intervals of major program activity*
- *Decision-oriented maturation events*
- *Distributed over the contract period (not inordinately clustered, as at the beginning or end)*
- etc.

ACCOMPLISHMENTS

- *Desired result prior to a specified event which indicates a level of design maturity or progress directly related to a product/process*
- *Discrete activities/step in the progress of the planned development*
- *Describes interface/interrelationships of different disciplines applied to the program*

- Sequenced in a manner that tracks against key events
- Must be a required activity to be completed prior to an event--not just time coincidental
- etc.

Definition:

***IMS: Integrated Master Schedule**-- the detailed task and timing of work effort in the IMP. It is used by government and contractor management as the primary tracking tool for technical and schedule status*. The IMS is a supplement to the IMP and is an integrated and networked multilayered schedule of program/project tasks. The IMS is a networked schedule that *identifies all IMP events, accomplishment, and criteria and the expected dates of each based on the calendar dates provided as the starting point and the logical flow of dates provided by calculating the addition of duration of all tasks using typical schedule networking tools. The IMS tasks will be directly traceable to the IMP and the WBS.*

Integrated Master Schedule (IMS). *The Offeror shall provide an IMS as part of their proposal submittal. It will be a top level IMS which should be directly traceable to the IMP. The more detailed levels of the IMS (which will be submitted after contract award as a contract data requirements list deliverables) should correspond with the work packages defined for a specific program/project, with duration and assigned resources. The intent of the IMS is to be a tool available for use in day to day tracking of the program/project that rolls up to a top level or summary level. All tasks/activities in the IMS should be logically linked together showing predecessor/successor relationships. The activities and tasks defined in the proposal will be sufficient to account for the entire program under contract. Key elements of the IMS may include:*

A. Milestone/Event - A specific definable accomplishment in the program/project network, recognizable at a particular point in time.

B. Activity or Task - A time consuming element, e.g., work in progress between interdependent events, represented in an activity box. Activities are numbered and are contained within an activity box. The left side represents the beginning of the activity, and the right side is the completion of the activity.

C. Duration - The length of time estimated to accomplish an activity. (Disregard the "calendar impacts")

D. Constraint - A line that defines how two activities or events are logically linked.

E. Lead - The amount of time of the overlap between where a successor task begins and a predecessor task completes.

F. Lag - The amount of time between the end of a predecessor task and the beginning of a successor task.

G. Critical Path -A sequence of activities in the network that has the longest total duration through the program/project. Activities along the critical path have zero or negative slack/float. It should be easily distinguished on the report formats.

H. Target Start (TS)

I. Target Complete (TO)

J. Actual Start (AS)

K. Actual Finish (AF)

L. Early Start (ES)

M. Early Finish (EF)

N. Late Start (LS)

O. Late Finish (LF)

P. Gantt Chart - A graphical display of program activities and key milestones that depict work activities in an integrated fashion. Activities are represented by bars showing the length of time for each activity. Gantt charts should be supported by and consistent with the IMS or supportive of the IMS when it is descriptive of lower levels of detail than depicted in the IMS.

Sample Language for Section M

Factor - *An evaluation will be made of the offeror's Integrated Master Plan (IMP) and Integrated Master Schedule (IMS) as they incorporate and reflect the approaches described in the offeror's proposal.*

Sample Language for Standards portion of the Source Selection Plan

Standard:
Evaluation will be made on the adequacy and completeness of the proposed management process and plan to complete all of the work necessary to meet the requirements of the RFP, to include IMP and IMS. The approach and thoroughness in program management including organization, multidisciplinary integration, customer involvement, and staffing will be considered.

IMP - Proposes an IMP that includes the Government's Minimum Contract Events listed in the RFP. Proposes an IMP that includes as significant accomplishments each required step to complete an event and significant accomplishment criteria that are substantive, unambiguous, and measurable standards by which completion of significant accomplishments can be demonstrated. Proposes an IMP narrative that defines and commits to a program management process that is responsive to each of the topics listed in the SOW. The program management approach describes an organization of Integrated Product Teams (IPT) to implement the critical processes. These teams have the full responsibility, authority, and accountability for one or more contract products along with system engineering and other cross-product teams process.

IMS - Proposes an IMS that shows the calendar schedule for the work planned to achieve each significant accomplishment and meet each significant accomplishment criterion leading up to each event and each delivery in accordance with RFP section F for the entire contract. Proposes an IMS for which the data can be readily linked to that in the IMP and conversely.

APPENDIX B

EXAMPLE OF AN IPT CHARTER
Integrated Product and Process Management Working Group Charter

Introduction: This Charter for the Integrated Product and Process Management Working Group outlines the identification, responsibilities, makeup and products for the Working Group.

References/Guidance:
AMC IPPM Guidebook (Pamphlet 70-27, Vol. 1, 2, 3), 25 May 95.
Draft DODI 5000.2, 30 Jan 96.

Background: The Department of Defense has been working to find the best methods for reengineering the acquisition process. As a result on May 10, 1995, the Secretary of Defense directed that the concepts of Integrated Product and Process Development (IPPD), and Integrated Product Teams (IPT) be applied throughout the acquisition process. During 1991, the Army Materiel Command initiated a 3-year series of concurrent engineering workshops. These workshops led to the on-going IPPM Working Group.

Purpose/Goals:
- Coordinate AMC activities in this area.
- Act as a central repository for knowledge in this area.
- Provide a focal point for maintaining community awareness of guidance, information, and related events and activities.

a. Period of Performance: It is expected that the need for this Working Group will require it to be in existence for a considerable period of time. Therefore, this charter will remain in effect and be reviewed at each Biannual IPPM Working Group Meeting.

b. Budget: Each participating member’s organization will be responsible for funding and resources required for their participation.

c. Responsible Agent: Army Materiel Command (AMCRD-IEC) is identified and will act as the responsible agent for the IPPM Working group.

d. Team Responsibilities: Team members are encouraged to attend meetings. Furthermore, team members are asked to provide assistance in actions such as staffing documents
and providing expertise. Additionally, members are empowered to foster the use of IPPM practices within their organizations.

e. Team Products: Biannual meetings will be held, as well as needed video teleconferences. A product of these meetings will be minutes of the meeting for distribution. Other products of the group will be--

- AMC IPPM Manual
- Articles Published
- Road Show Participation

List POCs

a. Team Membership: ***Team traveling to Biannuals***

b. Reflector Groups: ***Everyone attached via Internet***

GLOSSARY

ACAT	Acquisition Category
AMC	Army Materiel Command
CD	Combat Developer
CE	Concurrent Engineering
COEA	Cost and Operational Effectiveness Analysis
DOD	Department of Defense
DTLOMS	Doctrine, Training, Leader Development, Organization and Materiel in support of Soldiers
DT&E	Developmental Test and Evaluation
ECP	Engineering Change Proposal
EM	Electromagnetic
EMD	Engineering and Manufacturing Development
ICT	Integrated Concept Team
ILS	Integrated Logistics Support
ILSP	Integrated Logistics Support Plan
IMP	Integrated Master Plan
IMS	Integrated Master Schedule
IOT&E	Independent Operational Test and Evaluation
IPPD	Integrated Product and Process Development
IPPM	Integrated Product and Process Management
IPT	Integrated Product Team
LRIP	Low Rate Initial Production
LSA	Logistics Support Analysis
MACOM	Major Army Command
MANPRINT	Manpower and Personnel Integration
MD	Materiel Developer
MNS	Mission Need Statement
MSC	Major Subordinate Command
NDI	Nondevelopmental Item
OPTEC	Operational Test and Evaluation Command
ORD	Operational Requirements Document
PEO	Program Executive Officer
PM	Program Manager
POC	Point of Contact
RAM	Reliability, Availability and Maintainability
RDEC	Research, Development and Engineering Center
RFP	Request For Proposal
RFW	Request For Waiver
SOW	Statement of Work
SSEB	Source Selection Evaluation Board
STAR	System Threat Assessment Report
TECOM	Test and Evaluation Command
TDP	Technical Data Package
TEMP	Test and Evaluation Master Plan

TNS	Technology Need Statement
TRADOC	Training and Doctrine Command
VE	Value Engineering
WBS	Work Breakdown Structure